ENVIRONMENTAL NONRADIOLOGICAL PROGRAM INFORMATION

Overview of New York State Water Classifications, Water Quality Standards, and Water Effluent Limits

The objective of the Clean Water Act of 1972 (CWA) (as stated in Section 101 of the Act) is to restore and maintain the integrity of the nation's waters and ensure that, wherever attainable, waters be made useful for fishing and swimming. To achieve this goal, New York State is delegated with authority under Sections 118, 303, and 510 of the CWA to (1) classify and designate the best uses for receiving waters, such as streams and rivers, within its jurisdiction; and (2) establish and assign water quality standards – goals for achieving the designated best uses for these classified waters. In addition to achieving CWA goals for fishing and swimming, New York has further classified its jurisdictional waters and established ambient water standards, guidelines, and maximum contaminant levels (MCLs) to achieve objectives under the Safe Drinking Water Act for drinking water. These standards serve as the basis for periodic evaluation of the integrity of the receiving waters and identification of needed controls, such as New York State Pollutant Discharge Elimination System (SPDES) permits and effluent limitations.

The definitions for best usage classifications of New York's jurisdictional waters and the water quality standard goals for these classifications are provided in Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (NYCRR) Parts 701–704. Mapping of the Cattaraugus Creek drainage basin and assignment of best usage designations and classification to each receiving water segment within this drainage basin are described in 6 NYCRR Part 838. According to these regulations, Frank's Creek, Quarry Creek, and segments of Buttermilk Creek under the influence of West Valley Demonstration Project (WVDP) water effluents are identified as Class "C" receiving waters with a minimum designated best usage for fishing with conditions suitable for fish survival. Cattaraugus Creek, in the immediate downstream vicinity of the Western New York Nuclear Service Center (WNYNSC), is identified as a Class "B" receiving water with best designated usages for swimming and fishing. All fresh (non-saline) groundwaters within New York are assigned a "GA" classification with a designated best usage as a potable water supply source.

Presented in Appendix C-1[C] is a summary of the numerical water quality standards, guidelines, and MCLs assigned to these water classifications for those substances and parameters that are included

in the WVDP environmental monitoring program for ambient water. Also included in Appendix C-1C are SPDES Permit discharge limits for site effluents.

Surface Water, Subsurface Drainage Water, and Water Effluent Monitoring

Appendix C-2C contains process effluent data with SPDES Permit limits provided for comparison with these data. Appendices C-3 through C-5C present data for ambient surface water, subsurface drainage water, contained water, and potable water monitoring locations. Also provided for side-by-side comparison with these data are reference values, where available, including background ambient water monitoring data and/or pertinent ambient water quality standards (AWQS), guidelines, or MCLs.

SPDES Permit-Required Monitoring. Liquid discharges are regulated under the State Pollutant Discharge Elimination System. The WVDP holds a SPDES Permit that identifies the outfalls where liquid effluents are released to Erdman Brook (Fig. A-2 [p. A-2]) and specifies the sampling and analytical requirements for each outfall. In August 2003, the WVDP filed an application with the New York State Department of Environmental Conservation (NYSDEC) for renewal of the SPDES Permit. In October 2003, NYSDEC issued a renewed permit, which will expire in 2009. The conditions and requirements of the SPDES Permit are summarized in Table C-1AC in Appendix C-1. The permit identifies five outfalls:

• outfall WNSP001, discharge from the low-level waste treatment facility (LLWTF)

• outfall WNSP007, discharge from the sanitary and industrial wastewater treatment facility

• outfall WNSP008, groundwater effluent from the perimeter of the LLWTF storage lagoons (closed in May 2001 but still in the permit)

• outfall 116, a location in Frank's Creek that represents the confluence of outfalls WNSP001, WNSP007, and WNSP008, as well as storm water runoff, groundwater seepage, and augmentation water. (Samples from upstream sources are used to calculate total dissolved solids at this location and to demonstrate compliance with the SPDES Permit limit for this parameter. Outfall 116 is referred to as a "pseudo-monitoring" point on the SPDES Permit. See p. GLO-8 in the Glossary.)

• outfall WNSP01B, an internal monitoring point for the liquid waste treatment system evaporator effluent, being monitored for flow and total mercury.

Some of the more significant features of the SPDES Permit are the requirements to report five-day biochemical oxygen demand (BOD_5), total dissolved solids (TDS), iron, and ammonia data as flow-weighted concentrations and to apply a net discharge limit for iron. The net limit allows the Project to account for the iron that is naturally present in the site's incoming water. The flow-weighted limits apply to the flow-proportioned sum of the Project effluents.

The SPDES monitoring data for 2003 are displayed in Tables C-2C through C-2MC. The WVDP reported three permit excursions in 2003, all due to exceeded holding times for sample analysis at the off-site laboratory.

Mercury Analytical Method Study. The modified SPDES Permit received by the WVDP in July 2002 required a comparison study of mercury determination by two analytical methods: Environmental Protection Agency (EPA) Method 245.1

(or 245.2) with a detection level of 0.2 µg/L (parts per billion [ppb]) and EPA Method 1631, which allows determination of mercury at a minimum level of 0.5 ng/L (parts per trillion [ppt]). The latter ("ultraclean") method supports EPA's effort to make available an additional analytical method capable of measuring mercury accurately at ambient water quality criteria levels.

Since the SPDES Permit enforcement compliance limit of 0.2 µg/L for total mercury is several orders of magnitude higher than the AWQS of 0.0007 µg/L for dissolved mercury, the WVDP is required to conduct a mercury study using both methods (1631 and 245.1 or 245.2) whenever mercury samples are required under the terms of the SPDES Permit. A report summarizing the analytical results from these two methods and its findings is required to be submitted quarterly to NYSDEC.

Fourteen sets of samples from outfall 001 and five sets of samples from outfall 01B were analyzed for mercury by the two test methods in 2003. Samples were analyzed at Severn Trent Laboratories or Lionville Laboratories using Method 245.1 and at Frontier Geosciences, Inc. or General Engineering Laboratories using Method 1631.

All sample results from Method 245.1 were less than 0.2 µg/L, the practical quantitation limit for Method 245.1. Results generated with Method 1631 were consistent with results generated with Method 245.1. That is, all sample results generated with Method 1631 were reported at levels below 0.2 µg/L. The average concentration for samples collected at outfall 001 was 0.0164 µg/L and that for outfall 01B was 0.00889 µg/L.

South Plateau Surface and Subsurface Water. An inactive underground radioactive waste disposal site, the U.S. Nuclear Regulatory Commission-Licensed Disposal Area (NDA), lies on the south plateau of the site. Surface waters, which flow from the south to the north, are routinely monitored at several points around this area. (See Fig. A-2 [p. A-2].) Two of these points, WNNDATR and WNNDADR, are used to monitor (respectively) waters within the NDA water collection trench system and surface runoff and seepage immediately downstream of the NDA. Sampling point WNNDATR is an underground sump at the lowest point in the collection trench system that intercepts groundwater from the NDA. If radiological or nonradiological contamination were to migrate through the NDA, it would most likely be first detected in samples from WNNDATR.

Interceptor Trench and Pretreatment System. Radioactively-contaminated n-dodecane (similar to kerosene) in combination with tributyl phosphate (TBP) was discovered at the northern boundary of the NDA in 1983. To contain migration of this subsurface radioactive organic contaminant, an interceptor trench and a liquid pretreatment system (LPS) were built. (See NRC-Licensed Disposal Area [NDA] Interceptor Trench and Pretreatment System in Chapter 1 [p. 1-11].)

The trench was designed to intercept and collect subsurface water, which could be carrying n-dodecane/TBP, to prevent the material from entering the surface water drainage ditch leading into Erdman Brook and to prevent contamination of downgradient groundwater. The LPS was installed to separate the n-dodecane/TBP and to remove iodine-129 from the collected water before its transfer to the LLWTF. The separated n-dodecane/TBP would be stored for subsequent treatment and disposal.

In 2003, as in previous years, no water containing TBP was encountered in the trench. Results of surface and groundwater monitoring in the vicinity of the trench are discussed in Chapter 2 (South

Plateau Surface Water and NDA Interceptor Trench [p. 2-9]) and in Chapter 4 (Results of Monitoring at the NDA [p. 4-11]).

Total Organic Halides. Total organic halides (TOX) measurements are used as a screening mechanism to detect the presence of certain organic compounds and associated radionuclides. In 2003, concentrations of TOX at both WNNDATR and WNNDADR remained within the range of historical values.

Other On-Site and Off-Site Surface Water Monitoring. As part of the routine monitoring program, two sets of grab samples for nonradiological parameters at WNSP006 (Frank's Creek at the security fence), WNSWAMP (northeast swamp drainage), WNSW74A (north swamp drainage), and WFBCBKG (Buttermilk Creek at Fox Valley) were taken in 2003. These samples were screened for organic and inorganic constituents and selected anions, cations, and metals. Results of measurements for these locations are found in Tables C-4C, C-3C, and C-3D^{C}.

In 2003 the parameter list for nonradiological analyses and surface water monitoring locations was modified from a groundwater-oriented to a surface-water-oriented program. At locations WNSP006, WFBCBKG, and WFBCTCB, analyses were added to assess water quality with respect to applicable New York Water Quality Standards for Class C waters. At locations WNSWAMP and WNSW74A, the parameter list was modified so as to better define ambient surface water conditions at these outfalls.

At surface water monitoring location points WNSW74A and WFBCTCB, monitoring location WNSP006, and background reference location WFBCBKG, the maximum concentrations of total iron exceeded the water quality standard (0.30 mg/L). NYSDEC, in its 2002 CWA 303(d) report to the EPA, indicated it found the scientific basis for the 0.30 mg/L standard to be insufficient. NYSDEC also indicated that the upcoming standards review is expected to include a proposed replacement of the 0.30 mg/L with a 1.0 mg/L guidance value, based on 1976 U.S. EPA criteria. Nonetheless, the elevated iron concentrations, in particular at WNSW74A, which also exceeds this replacement guidance value, is indicative of typical concentrations in water runoff from areas where industrial activities are occurring.

At water monitoring locations WNSW74A and WNSWAMP, the maximum TDS concentration exceeded the water quality standard of 500 mg/L. Elevated TDS can result from runoff containing residuals from application of deicing materials (i.e., road salt). The elevated TDS concentrations at WNSW74A and WNSWAMP are believed to have resulted from runoff from site service roads and walkways where deicing materials are applied.

The maximum observed concentration of dissolved aluminum at surface water location WFBCTCB exceeded the water quality standard for this parameter. The elevated concentration at this location is indicative of, and is typical for, surface waters receiving water discharges from areas where industrial activities are occurring or have occurred.

Monitoring results for the standing water locations (WNSTAW series) are presented in Table C-4H^{C}. The total iron concentration at WNSTAW5 (0.62 mg/L) exceeded the 0.3 mg/L standard for class "D" surface waters. The elevated iron concentration at this standing water location is thought to be attributable to naturally-elevated background concentrations of iron.

Monitoring results for pH at locations WNSP005, WFFELBR, WFBCTCB, WNFRC67, and

WNDCELD are provided in Appendix C[C], Tables C-3A, C-4A, C-4B, C-4F, and C-4G. Although most pH values were within applicable standards, minimum results at WFFELBR, WNFRC67, and WNDCELD in 2003 were all below the lower pH limit of 6.5.

Low pH of precipitation in the western New York region may suppress pH in ambient surface waters, especially during times of high rainfall when precipitation runoff may account for a large proportion of stream flow. Average precipitation pH, as measured near and on the WVDP in 2003, was about 4.5, with a low pH of 3.85. (See Appendix D[C], Tables D-22 through D-26[C].)

Drinking Water Monitoring

Site drinking water is monitored to verify compliance with EPA and New York State Department of Health (NYSDOH) regulations. (See Safe Drinking Water Act [p. ECS-13] in the Environmental Compliance Summary.) Samples are collected annually and analyzed for nitrate, fluoride, cyanide, and metals concentrations. In addition, an annual sample was obtained for principal organic contaminants. The 2003 monitoring results indicated that the Project's drinking water met NYSDOH, EPA, and Cattaraugus County Health Department MCLs and drinking water quality standards.

Conductivity and pH in off-site and on-site drinking water are presented in Tables C-5A[C] and C-5B[C], respectively. Except for a pH of 6.42 at WFWEL05, below the lower limit of 6.5, all results were within applicable limits.

Results for inorganic, organic, and indicator analyses of utility room potable water at the distribution system entry point, location WNDNKUR, are listed in Table C-5C[C]. Monthly results for biological and residual chlorine analyses at site tap water locations are provided in Table C-5E[C]. All results were within NYSDOH MCLs and EPA maximum contaminant level goals. The annual result for nitrate-nitrogen in a tap water sample from the WVDP restroom sink, as analyzed by the Cattaraugus County Department of Health (Table C-5F[C]), was also below the MCL.

Soil and Sediment Monitoring

Sediments are found at the bottom of surface waters, including streams located within the WVDP and WNYNSC premises. Sediments provide habitat for a wide variety of benthic organisms, as well as juvenile forms of pelagic organisms. These organisms in sediments are in constant contact with substances that may be adsorbed to sediment particles. Contaminated sediments are also potential diffuse sources of contamination to the overlying water body.

In 1999, NYSDEC issued updated guidance for screening contaminated aquatic sediments. This guidance includes sediment quality criteria correlated to the severity of environmental impact. These criteria, which are derived from National Oceanic and Atmospheric Administration (Long and Morgan, 1990) and 1992 Ministry of Ontario Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Persaud et al., 1992), are presented in Appendix G-1[C], Table G-1B.

Contaminants in soils are potential sources for contamination of groundwater, ambient air, flora, and fauna. Table G-1A[C] gives a summary of reference criteria, including background concentration ranges for eastern United States soils and sediment screening levels. Data for soil and sediment monitoring locations are provided in Appendix G-2[C]. Also, provided for side-by-side comparison with these data, are reference val-

ues, where available, including background concentrations and/or sediment screening levels.

At SNSP006, all analytical results for sediments were below the Severe Effect Level and No Appreciable Contaminant Levels specified in the NYSDEC guidance. According to the NYSDEC "Technical Guidance for Screening Contaminated Sediments," these results suggest there is no pronounced disturbance of the sediment-dwelling biological community and that there is no significant harm to benthic aquatic life at this location.

Results for arsenic, copper, manganese, and nickel in the sediment sample obtained at SNSP006 exceeded the Lowest Effect Level but were below the Severe Effect Level. Based on the NYSDEC sediment screening guidance, moderate impacts to benthic life could be expected at this location.

At SNSW74A and SNSWAMP, concentrations of zinc exceeded the eastern United States background soil concentration range identified in the NYSDEC Technical Administrative Guidance Memorandum #4046 for "Determination of Soil Clean-Up Objectives and Clean-Up Levels." Calcium and magnesium at SNSW74A also exceeded the eastern background soil concentration range. Concentrations of these naturally-occurring metals above the natural background ranges may be indicative of localized, naturally-elevated background concentrations of metals in soils or deposition of sediment from runoff from areas where industrial activities are occurring.

Air Emission Monitoring

Nonradiological air emissions are permitted under NYSDEC and EPA regulations. (The regulations that apply to the WVDP are listed in Appendix K^C, Table K-2. The New York State Facility Air Permit held by the WVDP is described in Table ECS-8, West Valley Demonstration Project Environmental Permits [pp. ECS-26 and ECS-27] in the Environmental Compliance Summary.)

The nonradiological air permits are for emissions of regulated pollutants that include particulates, ammonia, nitrogen oxides, and sulfur dioxide. Emissions of oxides of nitrogen and sulfur are each limited to 99 tons per year.

The main contributing source of oxides of nitrogen and sulfur at the WVDP was the vitrification system melter, which was shut down in September 2002. Site boilers and standby diesel generators were left as the only contributors of nitrogen and sulfur oxides, at levels greatly reduced from those emitted by the melter.